

OIL ANALYSIS REPORT

Area Fwd Machinery Space [450296544] Thruster Fwd Aft - Lower Gearbox (S/N Sample Tag CL-06004- S6) Lube System

Fluid GEAR OIL ISO 150 (--- GAL)

DIAGNOSIS

Recommendation

Little or no information is provided as to the component and lubricant being tested. Recommendations are therefore generic in nature and may not apply to the current application. Please forward information as to equipment type, reservoir capacity, lubricant type and any pertinent information to allow for a more accurate assessment. We recommend you service the filters on this component. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. Please specify the brand, type, and viscosity of the oil on your next sample.

Wear

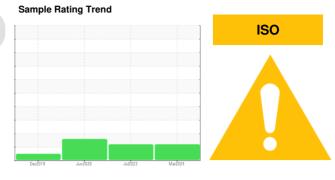
All component wear rates are normal.

Contamination

There is a moderate amount of silt (particulates < 14 microns in size) present in the oil.

Fluid Condition

The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PC0081680	PC	PC
Sample Date		Client Info		31 Mar 2024	24 Jul 2023	07 Jun 2020
Machine Age	hrs	Client Info		0	0	0
Oil Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				ABNORMAL	ABNORMAL	ABNORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Water		WC Method	>0.05	NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185(m)	>20	0	<1	2
Chromium	ppm	ASTM D5185(m)	>10	0	0	0
Nickel	ppm	ASTM D5185(m)	>10	0	<1	<1
Titanium	ppm	ASTM D5185(m)		0	0	0
Silver	ppm	ASTM D5185(m)		0	0	<1
Aluminum	ppm	ASTM D5185(m)	>10	0	<1	<1
Lead	ppm	ASTM D5185(m)	>20	0	0	0
Copper	ppm	ASTM D5185(m)		0	0	<1
Tin	ppm	ASTM D5185(m)	>10	0	0	0
Antimony	ppm	ASTM D5185(m)		0	0	<1
Vanadium	ppm	ASTM D5185(m)		0	0	0
Beryllium	ppm	ASTM D5185(m)		0	0	0
Cadmium	ppm	ASTM D5185(m)		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185(m)	limit/base	current 15	<mark>history1</mark> 15	<mark>history2</mark> <1
	ppm ppm					
Boron Barium	ppm	ASTM D5185(m) ASTM D5185(m)	50	15	15	<1
Boron Barium Molybdenum	ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15	15 0	15 0	<1 <1
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15	15 0 0	15 0 0	<1 <1 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50	15 0 0 0	15 0 0 0	<1 <1 <1 0
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50	15 0 0 0 <1 6	15 0 0 0 <1 3	<1 <1 <1 0 <1 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350	15 0 0 <1 6 166	15 0 0 0 <1	<1 <1 <1 0 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350 100	15 0 0 <1 6 166 5	15 0 0 <1 3 172	<1 <1 <1 0 <1 4 294
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350	15 0 0 <1 6 166	15 0 0 <1 3 172 4	<1 <1 <1 0 <1 4 294 14
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350 100	15 0 0 <1 6 166 5 8255	15 0 0 <1 3 172 4 9509	<1 <1 <1 0 <1 4 294 14 11372
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350 100 12500	15 0 0 <1 6 166 5 8255 <1	15 0 0 <1 3 172 4 9509 <1	<1 <1 <1 0 <1 4 294 14 11372 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350 100 12500 limit/base	15 0 0 <1 6 166 5 8255 <1 current 1	15 0 0 <1 3 172 4 9509 <1 history1 2	<1 <1 <1 0 <1 4 294 14 11372 <1 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350 100 12500 limit/base	15 0 0 <1 6 166 5 8255 <1 current	15 0 0 <1 3 172 4 9509 <1 history1	<1 <1 <1 0 <1 4 294 14 11372 <1 history2 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D5185(m)	50 15 15 50 350 100 12500 limit/base >15	15 0 0 <1 6 166 5 8255 <1 <i>current</i> 1 <1	15 0 0 <1 3 172 4 9509 <1 history1 2 <1	<1 <1 <1 0 <1 4 294 14 11372 <1 history2 <1 1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350 100 12500 limit/base >15 >20	15 0 0 <1 6 166 5 8255 <1 <i>current</i> 1 <1 0	15 0 0 (1 3 172 4 9509 <1 history1 2 <1 2 <1 2	<1 <1 <1 0 <1 4 294 14 11372 <1 history2 <1 1 1 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D5185(m)	50 15 15 50 350 100 12500 limit/base >15 >20 limit/base	15 0 0 (1 6 166 5 8255 <1 <i>current</i> 1 <1 0 <i>current</i>	15 0 0 1 3 172 4 9509 <1 history1 2 <1 <1 <1 <1 history1	<1 <1 <1 <1 <1 <1 <1 <4 294 14 294 14 11372 <1 history2 <1 1 <1 <1 history2 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D5185(m)	50 15 15 50 350 100 12500 limit/base >15 >20 limit/base >5000	15 0 0 1 4 1 6 166 5 8255 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	15 0 0 1 3 172 4 9509 <1	<1 <1 <1 0 <1 4 294 14 11372 <1 history2 <1 1 1 <1 <1 history2 28159
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D5185(m)	50 15 15 50 50 350 100 12500 12500 limit/base >15 >20 limit/base >5000 >1300 >160	15 0 0 1 4 1 6 166 5 8255 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	15 0 0 0 <1 3 172 4 9509 <1 • • • • • • • • • • • • • • • • • •	<1 <1 <1 0 <1 4 294 14 11372 <1 history2 <1 1 1 1 <1 2 1 bistory2 ×1 2 8 5 9 ×1 1 2 8 7 700
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D76477 ASTM D7647	50 15 15 50 50 350 100 12500 12500 limit/base >15 >20 limit/base >5000 >1300 >160	15 0 0 3 4 1 6 166 5 8255 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	15 0 0 0 1 172 4 9509 <1 0 10149 10149 92 355 92	<1 <1 <1 <1 <1 <1 294 14 11372 <1 <1 <1 <1 <1 <159 28159 385
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >21µm Particles >38µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647	50 15 15 50 350 350 100 12500 12500 limit/base >15 >20 limit/base >5000 >1300 >1300 >160 >40	15 0 0 2 3 4 1 6 166 5 8255 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	15 0 0 0 1 1 3 172 4 9509 3 172 4 9509 3 172 4 9509 3 172 4 9509 3 172 4 9509 3 172 4 9509 3 1 172 4 9509 3 1 172 4 9509 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<1 <1 <1 0 <1 4 294 14 11372 <1 history2 <1 1 <1 <1 <1 history2 <1 2 8 2 8 5 9 4 7700 3 8 5 7 6
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	50 15 15 50 350 100 12500 limit/base >15 >20 limit/base >5000 >1300 >160 >40 >10	15 0 0 3 4 1 6 166 5 8255 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	15 0 0 0 1 1 3 172 4 9509 <1 0 172 4 9509 <1 0 172 4 9509 <1 0 172 4 9509 <1 1 10149 2355 92 18 0	<1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <



🔺 Particle Count

🔺 Particle Trend

Abnorma

Acid Number

144

Jun7/20 .

Jun7/20 .

Viscosity @ 100°C

214

491,520 122.88

^{30,720}
 ^{30,720}

number of particles (per 1 1.92 480 120 30

7 68

8

30 Ê^{25k}

m [] 20k 15k 10k 5k

0

1.60-Abnorma

1.40

1.40 1.20 1.00 KOH(8) 1.00 0.80 0.60

- 명 0.40 Abno

0.20 0.00

> 13 Abnorma

12 11

Dec1

Bas

Dec18/19

OIL ANALYSIS REPORT

FLUID DEGRA		method	limit/base	current	history1	history
Acid Number (AN)	mg KOH/g	ASTM D974*	0.85	0.46	0.51	0.52
VISUAL		method	limit/base	current	history1	history
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Precipitate	scalar	Visual*	NONE	NONE	NONE	NONE
Silt	scalar	Visual*	NONE	NONE	NONE	NONE
Debris	scalar	Visual*	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	Visual*	NONE	NONE	NONE	NONE
Appearance	scalar	Visual*	NORML	NORML	NORML	NORML
Odor	scalar	Visual*	NORML	NORML	NORML	NORML
Emulsified Water	scalar	Visual*	>0.05	NEG	NEG	.2%
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history
Visc @ 40°C	cSt	ASTM D7279(m)	150	143	145	147
Visc @ 100°C	cSt	ASTM D7279(m)	15.0	14.2	14.2	14.3
Viscosity Index (VI)	Scale	ASTM D2270*	99	96	94	94
SAMPLE IMAGES m		method	limit/base	current	history1	history

Color

384

Bottom

Mar31/24



Jun7/20 . Mar31/24 -Jul24/23 Dec18/19 Viscosity @ 40°C 170 165 160 () 155 () 150 (+) 150 145 140 Abnorma 135 130 Jun7/20 Jul24/23 -Mar31/24 -Dec18/19



Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 CALA Received Sample No. : PC0081680 : 26 Apr 2024 Lab Number : 02631762 Tested : 29 Apr 2024 ISO 17025:2017 Accredited Laboratory Unique Number : 5772915 Diagnosed : 29 Apr 2024 - Kevin Marson Test Package : MAR 2 (Additional Tests: KV100, TAN Man, VI) To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

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Contact/Location: Josh Hynes - TERHAM Page 2 of 2